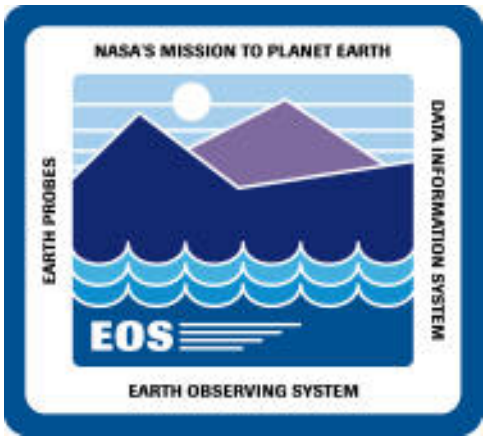


Modeling Workshop #2
Overview

21 February 1996

731-PP-002-001

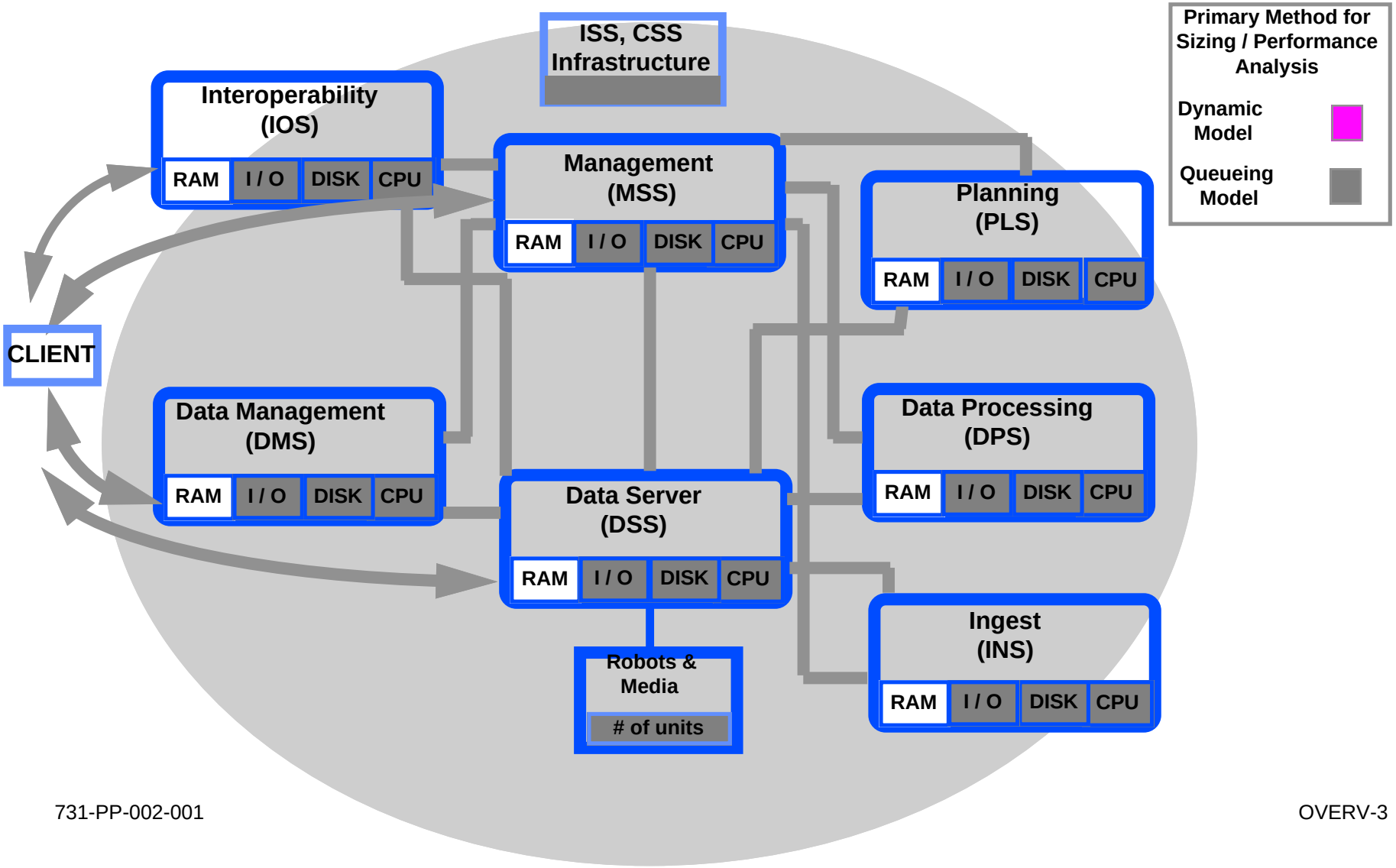
Background

- **At IDR, we briefed an approach to developing an "end to end" model. The IDR Review Panel specifically requested two reviews prior to Release B CDR to ensure that ECS stayed on track:**
  - **Review 1: Assumptions and Scenarios (completed)**
  - **Review 2: Preliminary Results**

- **To date, modeling activities**
  - ***have* focused on system resources that are in contention for both production and distribution, and on "tall poles" from a cost point of view.**
  - **have *not* analyzed all of the subsystem hardware components.**
  - **have *not* analyzed transactions between all subsystems.**

At IDR, infrastructure (i.e., communications and management overhead) was a specific area of concern.

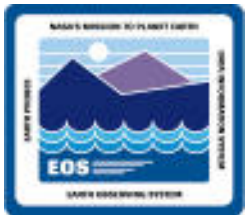
ECS System / Modeling Context



Modeling Workshop #1 Assumptions, Scenarios

- **The first modeling workshop (via telecon) focused on assumptions, methodology and scenarios:**
  - **no major problems**
  - **general agreement on approach**
  - **many specific recommendations for further analysis, primarily focusing on excursions from expected normal conditions (what ifs)**

Modeling Workshop #2
Preliminary Results



- **Today's briefing focuses on preliminary results:**
  - **modeling excursions that primarily affect the production and data server subsystems**
  - **initial results of transaction analysis for end to end threads**

- **Many excursions were requested in the IDR timeframe and help confirm our IDR and CDR design**

- **Additional excursions were requested in Workshop #1 and will be addressed at CDR and post-CDR modeling updates**

- **Preliminary end to end analysis focuses on user and production driven threads, vs. operations driven threads**

- **Analysis of infrastructure resource requirements (briefed February 5 at Infrastructure Workshop) shows no tall poles**

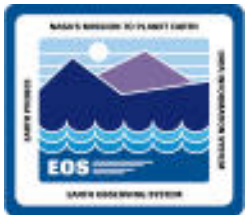
Workshop 2 Preliminary Results
IDR Requests

	WS # 2	CDR	POST
Sensitivity to User Pull	Interim	Results	Update
-- Volume composition (w/4x distribution)			
-- Request type			
-- Decimation			
Archive Sensitivity Study	Interim	Results	Update
-- Hardware trades			
-- Middle tier/time blocking trades.			
-- User Priority vs Production Priority			
User Turnaround Times	Interim	Results	Update
Reprocessing Study			
-- Different processing assumptions	Interim	Results	
End to End Model	Interim	Results	Update

Workshop 2 Preliminary Results
WS#1 Requests

	WS # 2	CDR	POST
Failure Injection and Recovery	Interim	Results	
I/O Channel & Device Timing	Testing	Interim	Results
Input Perturbation (EDOS, ASTER)	Design	Interim	Results

Modeling Analysis Updates Workshop # 1 Questions



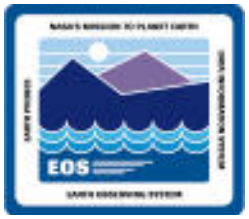
Users/Pull: “Archive Sensitivity Study”; “Sensitivity to User Pull”

- **User pull is stochastic; functional impact? (Lynnes)**
- **What are the basic functions relative to the archive (Lynnes)**
- **Data Server model is top priority; need by pull (Lynnes)**
- **What is the ripple effect of user pull assumptions (Harris)**
- **How many orders/day to break system? (Lynnes)**
- **What is efficiency of different block sizes? (Harris)**

Processing: “User Turnaround Time”; “Reprocessing Study”

- **Put bound on I/O; Vary I/O overhead (Glover)**
- **Percent retrieved from staging vs archive/PGE? (Lynnes)**
- **What is bandwidth between DSS and Processing? (Lynnes)**
- **Vary the DAAC requested distribution (Lynnes)**
- **I/O and memory allocation (Lynnes)**

Workshop # 2 Interim Results
Workshop # 1 Questions (Cnt'd)



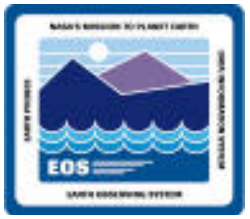
Failure - Recovery: 'Failure Injection and Recovery"

- **Investigate breakage, impacts, catch-up time (Barkstrom)**
- **Error recovery for both PGEs and ECS software/hardware must be included (Lynnes)**

Sensitivity Study - Push Input: Capability being added to model

- **EDOS needs perturbation of delivery rate - 2x, .5 x (Oleson)**
- **EDOS Perturb constant input - stochastic; 2x (Glover)**
- **EDOS High variability of EDOS input (@ 15 min - 21 hrs) (Lynnes)**
- **EDOS Bimodal input? (Lynnes)**
- **ASTER Physical delivery @ 5 vs 7 days/week (EDC)**
- **ASTER Physical delivery may be @ 1 per 2 weeks(EDC)**
- **ASTER Takes 24 hrs to read tapes @14/day (10GB tapes) (EDC)**
- **What is sensitivity to external events? (Glover)**

Workshop # 2 Interim Results
Workshop # 1 Questions (Cnt'd)



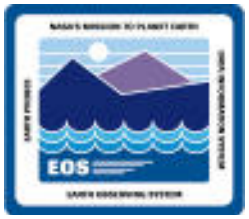
Sensitivity Study - Distribution: Some results in User/Pull; Need temporal variability data

- **Look at 50% media, 50% network assumption (Barkstrom)**
- **Expansion of 24 hr distribution buffer (Glover)**
- **2X distribution affected by diurnal & weekly variability (5 vs 7 days) (Lynnes)**
- **What is relative size of reorder vs 24 hr dist disk size? (Lynnes/Glover)**
- **Look at 2X vs 4X distribution (disk size?) (Lynnes)**
- **Vo average pull/pickup is 40 hrs (Lynnes)**
- **ECS to add a warning notice before deletion (Lynnes)**
- **Nominal 100kBps band width to users is typically 50 - 75. (Lynnes)**

End-to-End Response Times: Status Briefing

- **Exercise a wide range of parameters and time profile (Barkstrom)**

Modeling Workshop # 2 Agenda



Workshop Overview	8:30
Sensitivity to User Pull	9:00
Archive Sensitivity Study	10:00
User Turnaround Times	11:00
----------LUNCH ----------	12:00
Reprocessing Study	1:00
Failure Injection and Recovery	2:00
End to End Model	3:00